

IN THE CLAIMS

1. (currently amended) A decoding apparatus comprising:
acquiring and equalizing means for acquiring encoded data and performing a partial-response equalization on the encoded data, which is an information series encoded by a turbo code and by a run length limited code having a first finite state transition diagram, then converted and carried on an intersymbol interference path; and

means for combined detecting and decoding the equalized, turbo code encoded data based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference, the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values, and whether a polarity is inverted or not, of a non-return to zero coding of states in a first finite state transition table; wherein the states of the second finite state diagram are defined by a division of each of the states in the first finite state transition table into two transition states of the second finite state transition diagram, according to whether an immediately preceding non-return to zero code of the state of the first finite state transition table is zero or one; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

2-7. (canceled)

8. (currently amended) A decoding method comprising the steps of:

acquiring encoded data and performing a partial-response equalization on the encoded data, which is encoded by a turbo code and by a run length limited code having a first finite state transition diagram, then converted and carried on an intersymbol interference path; and

combined detecting and decoding the equalized, turbo code encoded data based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference, the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values, and whether a polarity is inverted or not, of a non-return to zero coding of states in a first finite state transition table; wherein the states of the second finite state diagram are defined by a division of each of the states in the first finite state transition table into two transition states of the second finite state transition diagram, according to whether an immediately preceding non-return to zero code of the state of the first finite state transition table is zero or one; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

9. (currently amended) A program storage medium storing a computer-readable program that describes the steps of:

acquiring and equalizing encoded data by performing a partial-response equalization on the encoded data, which is encoded by a turbo code and by a run length limited code having a first finite state transition diagram, converted and carried on an intersymbol interference path; and

combined detecting and decoding the equalized, turbo code encoded data based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference, converted and carried on an intersymbol interference communication path; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values, and whether a polarity is inverted or not, of a non-return to zero coding of states in a first finite state transition table; wherein the states of the second finite state diagram are defined by a division of each of the states in the first finite state transition table into two transition states of the second finite state transition diagram, according to whether an immediately preceding non-return to zero code of the state of the first finite state transition table is zero or one; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

10. (canceled)

11. (currently amended) A recording/reproducing apparatus comprising:

encoding and converting means for encoding an information series by a turbo code and by a run length limited code with a first finite state transition diagram, and performing a partial-response equalization conversion on the encoded data;

recording/reproducing means for recording and reproducing data encoded and converted by the encoding and converting means,

in and from a recording medium having an intersymbol interference path;

equalizing means for partial-response equalizing the reproduced data; and

combined detecting and decoding means for detecting and decoding the equalized, turbo code encoded data reproduced based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values, and whether a polarity is inverted or not, of a non-return to zero coding of states in a first finite state transition table; wherein the states of the second finite state diagram are defined by a division of each of the states in the first finite state transition table into two transition states of the second finite state transition diagram, according to whether an immediately preceding non-return to zero code of the state of the first finite state transition table is zero or one; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.